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Davos Leaders Sing Praises of GMO Soil Microbes, But Critics Warn of 'Irreparable Consequences'

Panelists at the World Economic Forum hailed genetically engineered microbes as the future of sustainable and climate-friendly agriculture, but watchdog groups warned that the genetic modifications released inside the microbes could move across species and geographic boundaries with unforeseen and potentially irreparable consequences.

By Brenda Baletti, Ph.D.

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The topic of "synthetic biology" — the science of reengineering living organisms to have "new abilities" geared toward solving problems in fields ranging from medicine to manufacturing to agriculture — came during several sessions held last week at the World Economic Forum (WEF) meetings in Davos, Switzerland.

Synthetic biology is the basis of the so-called "bioeconomy" valued at a trillion dollars in the U.S. and set to grow globally to over $30 trillion in the next two decades, according to Forbes. Initiatives like the Biden administration's 2022 executive order mandating federal investment in biotech are expected to drive that growth.

Bioproducts include everything from mRNA vaccines to lab-grown meats, to bioelectronic medical devices. But much of the excitement during two of last week's WEF panels on synthetic biology in food and agriculture — "Biology as Consumer Technology" and the "Bio-based Path to Net Zero" — centered on "biologicals," which are genetically engineered (GE) nitrogen-fixing soil microbes.

Biologicals are farm inputs derived from living organisms like plants and bacteria rather than from fossil fuels, the source of most modern pesticides and fertilizers.

Biologicals produced through synthetic biology aren't just living organisms, they are GE living organisms made to kill pests or to generate nutrients that are then used to fertilize plants.

They also are major money-makers for the companies that make them and for their investors, panelists were quick to point out.

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Reeducating consumers to embrace processed foods

Chris Abbot, CEO of Pivot Bio Inc., maker of Proven, the first GE microbe on the market, spoke about how companies like his are "leveraging technology so that we actually can produce a product and sell it at an attractive margin" despite volatility in the commodity market.

Amy Webb, CEO and "global leader of strategic foresight" at the Future Today Institute called Pivot's GE microbe product "amazing," especially given that "agriculture hasn't changed in like 14,000 years, I mean, not really, right?"

Webb was likely referring to the Neolithic revolution when humans transitioned from hunter-gatherers as agriculture emerged around the globe — something that happened approximately 12,000 (not 14,000) years ago.

The Neolithic revolution was followed by a series of major technological innovations in farming throughout the world over thousands of years.

Such innovations include many of the technological developments these new GE technologies are attempting to refine, such as the Haber-Bosch process — the industrial process that enhanced the nitrogen-fixing that is key to soil fertilization.

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Abbot said his company's GE microbes are being trained to do similar nitrogen-fixing in more efficient and less environmentally destructive ways. At some, yet unknown, point in the future, he predicted the GE microbes will be less expensive and more effective than existing synthetic fertilizers.

That GE microbes are more "sustainable" is a key part of their branding.

On the "Net Zero" panel, Ester Baiget from Novozymes, who announced her company is about to merge with engineered microbe producer Chr. Hansen, explained how her company's products "bring us closer to Net Zero."

"Everything we do leads to lower CO2 emission, lower chemical[s], lower waste, lower impact to the environment, healthier nutrients, higher sustainability on agriculture across the whole value chain," she said. "We enable healthier foods, we enable sustainable foods."

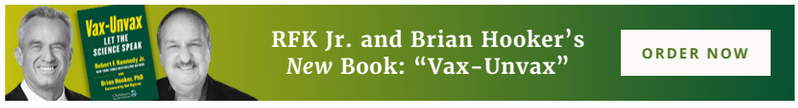
On the "Biology as Consumer Technology" panel, Dror Bin, CEO of the Israel Innovation Authority, predicted a future of "bioconvergence" where biology will merge with all scientific fields. Bioconvergence is not "imaginary," Bin said. For example, Israel last week became the first country to approve selling cultured beef, made by Aleph Farms.

The one roadblock panelists agreed they all face when it comes to growing the bioeconomy is consumer acceptance. People are needlessly afraid of genetically modified organisms (GMOs), according to Pivot's Abbot. "They're not that bad. You can use them the wrong way, but we [at Pivot] use a lot less chemistry because of GMOs."

Consumers, the panel agreed, need to be "reeducated" to embrace processed foods.

Biologics, Abbot conceded, are a little more "tricky" than synthetic fertilizers, "because you take a biologic organism, which has its own variability and they're generally pretty fickle. And then you put it in a biological environment in soil with crazy weather that's getting crazier every single year. And now try to predict to the earlier point how these things are all going to work."

But that's the exciting part, he said.



An 'unprecedented open-air experiment'

Outside of the WEF, there's less enthusiasm for GE microbes and other "food as software" synthetic biology technologies, such as precision fermentation or lab-grown meat.

A report published last August by Friends of the Earth raised concerns about the unknown and potentially disastrous risks associated with GE microbes, which are fundamentally different from the already controversial GMOs that, as panelists noted, have already been highly controversial for decades.

GE microbes are living organisms that share their genetic material easily with other species and travel vast distances in the wind. The genetic modifications released inside the microbes could move across species and geographic boundaries with unforeseen and potentially irreparable consequences, the report said.

And because they are microscopic, their numbers are vast.

"An application of GE bacteria could release approximately 3 trillion genetically modified organisms every half an acre — that's about how many GE corn plants there are in the entire U.S.," said Dana Perls, food and technology program manager at Friends of the Earth, in a press release.

Introducing GE microbes into agriculture represents an "unprecedented open-air genetic experiment," the report says. "The scale of release is far larger, and the odds of containment are far smaller, than for GE crops."

The report detailed a range of genetic mishaps that can, and in some cases, have occurred in the process of genetic engineering, including unintended DNA insertions and deletions.

It underscored that when these microbes with these potential problems are released into an environment with billions of species of other microbes — most of which science does not yet understand — along with other living things, the potential problems are myriad and serious.

No framework for assessing risks

Those risks haven't stopped companies from releasing them. At least two GE microbes, Pivot Bio's Proven and BASF's Poncho Votivo seed treatments, are already being used by U.S. farmers on millions of acres of farmland.

The WEF panelists predicted the number of GE microbes on the market is set to skyrocket — especially given that the U.S. regulatory system has no framework for assessing their potential risks and greenlights them rapidly.

Panel participants said they prefer to develop their products for the U.S. market rather than the European one, which has many more regulatory barriers for genetically modified or engineered products and approval takes six years.

The U.S. regulatory framework is so unclear, according to Big Food watchdog group Food Tank, that it is hard to know how many of these products are actually on the market. But, "we are likely on the cusp of a wave of new GE biologicals moving from the lab to the field."

Pivot launched Proven in 2019. The company, backed by major biotech investors — including the Bill & Melinda Gates Foundation — raised more than $600 million in private equity based on its promise to "disrupt" agriculture by reducing the need for industrially-produced synthetic nitrogen, replacing it with “clean nitrogen” from GE microbes.

But its own scientific studies showed no reduction in nitrogen use by farmers when the GE microbe is applied.

Pivot Bio’s patent application for its GE microbe Proven, marketed as a nitrogen fertilizer, lists 29 different genes along with many proteins and enzymes that can be manipulated to “disrupt” and “short-circuit” the microbe’s ability to sense nitrogen levels in its environment and “trick” it into overproducing nitrogen.

The company’s scientists also published a study showing they were surprised to find removing genes enhanced nitrogen because it could have just as easily reduced it.

Pivot was the first company to get its GE microbes to market, but since then, several other startups and Pharma giants have gotten into the GE microbe game.

Abbot didn’t comment on his company’s studies, but he did say Pivot is scaling up its technology, aimed at creating an “enduring growth trend.”

In the last several years, five major agrochemical companies, Syngenta (ChemChina), BASF, Bayer-Monsanto, FMC Corp and Corteva (DowDuPont) have acquired most existing biologicals companies.

These are the same corporations that controlled the creation and distribution of GE crops in the past.

They have “a long track record,” Friends of the Earth wrote, of disregarding the environmental and health impacts of their products, systematically undermining small farmers, obstructing the regulatory process and hiding the truth about their products.

Today, these corporations are partnering with major biotech firms and startups to drive the process forward.

Companies developing microbes highlighted on the WEF panels included the Danish bioscience company Chr. Hansen, which has been working in agriculture 145 years and has an existing library of around 50,000 microbes. Indigo Ag also “enhances” natural microbes to address different agricultural challenges.

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Ginkgo Bioworks tells SEC releasing GE microbes can have ‘unknown’ effects

Ginkgo Bioworks, a major player in the synthetic biology industry, is actively involved in food and drug development, including vaccines, and “cell programming platforms,” biosecurity and disease surveillance.

It designs and engineers microbes for applications ranging from cannabinoid-producing bacteria to yeast fermenting food proteins to soil microbes.

The company commercializes its GE microbes through Joyn Bio, a partnership with Bayer.

Through Joyn Bio, Ginkgo plans to further its commitment to “harnessing the power of programmable biology to enable sustainable food production and food security worldwide,” by partnering with different companies to develop “agricultural microbial solutions across crops and geographies through broad, fully-enabled technical platforms that address diverse market needs.”

For example, last month the company announced a new partnership with French biotech startup OneOne Biosciences to develop an “espresso-machine type” to “amplify” microbes with different functions, such as nitrogen-fixing, carbon sequestration, and more at the point of use.

Behind its utopian, “forward-looking statements,” according to its press releases, “Ginkgo does not give any assurance that it will achieve its expectations.”

The company’s risk report, filed with the Security and Exchange Commission (SEC) and reported by the Organic Consumers Association (OCA), raised a number of concerns.

Similar to the risks highlighted by Friends of the Earth, Ginkgo told the SEC, “The release of genetically modified organisms or materials, whether inadvertent or purposeful, into uncontrolled environments could have unintended consequences,” which could be bad for business — its primary concern.

The report also stated:

> “The genetically engineered organisms and materials that we develop may have significantly altered characteristics compared to those found in the wild, and the full effects of deployment or release of our genetically engineered organisms and materials into uncontrolled environments may be unknown.
>
> “In particular, such deployment or release, including an unauthorized release, could impact the environment or community generally or the health and safety of our employees, our customers’ employees, and the consumers of our customers’ products.
>
> “In addition, if a high-profile biosecurity breach or unauthorized release of a biological agent occurs within our industry, our customers and potential customers may lose trust in the security of the laboratory environments in which we produce genetically modified organisms and materials, even if we are not directly affected.
>
> “Any adverse effect resulting from such a release, by us or others, could have a material adverse effect on the public acceptance of products from engineered cells and our business and financial condition. …

> "We could synthesize DNA sequences or engage in other activity that contravenes biosecurity requirements, or regulatory authorities could promulgate more far-reaching biosecurity requirements that our standard business practices cannot accommodate, which could give rise to substantial legal liability, impede our business, and damage our reputation."

"Ginkgo's SEC filing makes clear how unleashing Frankenmicrobes into the environment might wreak havoc," said OCA's Alexis Baden-Mayer.

Baden-Mayer also noted that Ginkgo has acquired several synthetic biology technologies developed by longtime Monsanto scientists and CRISPR co-developer George Church.

That makes Ginkgo "Bayer's most important partner in its 'Food-as-Software' scheme," according to Baden-Mayer.

A spokesperson for RethinkX, a tech think tank and forecaster, explained "Food-as-Software" to The Defender in an email:

> "Like software, food products will be continually improved through iteration as technology improves in both cost and capability and as these food component databases grow.
>
> "Integration with information technology and the internet means that improvements in production methods and/or ingredients can be downloaded and incorporated almost instantaneously, allowing production to be fully distributed and decentralized — just like software."

Baden-Mayer offered a more critical description of Big Food's food-as-software vision:

> "The Monsanto-Bayer business model is to ruin food and farming with pesticides and factory farms, and then, when customers clamor for 'clean food,' to offer it up in the form of new, lab-created synthetic Frankenfoods that can be marketed as toxin- and cruelty-free."

Ginkgo's report to the SEC, she wrote, "reads like a science fiction writer's list of plots for disaster movies."

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Brenda Baletti, Ph.D.

Brenda Baletti Ph.D. is a reporter for The Defender. She wrote and taught about capitalism and politics for 10 years in the writing program at Duke University. She holds a Ph.D. in human geography from the University of North Carolina at Chapel Hill and a master's from the University of Texas at Austin.

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WEF WHO
12 days ago
The WEF members have completely lost the plot. They will collapse the biosphere and in the process they'll point the finger at everyone and everything else but themselves, global warming, cows, people(sheeple), what next? cat and dogs, hmmm maybe goats and sheep next.
7 0 Reply • Share ›

Polly Green
12 days ago
If there is one overarching global threat that originates with Weftists and WHOzits, it's this.
It's a threat right up there with biblical-style global famine, rivers running with blood, waters covering every land mass.
6 0 Reply • Share ›

Alan Porianda
11 days ago
Farmers throughout the world know how best to grow their crop efficiently with minimal changes needed to their farming practices from corporations. Just look at the Nutrient Management program from the Maryland Department of Agriculture that reduces the chance for soil polutants from reaching waterways and optimizes the production of crops for farming efficiency. That kind of program is all the "high tech" farmers need.
5 0 Reply • Share ›

Beatrice → Alan Porianda
11 days ago

Farmers are indeed some of the best climate, soil and atmospheric scientists on the planet.

3 0 Reply • Share ›

Sherry Kettner
12 days ago

Why should agriculture change? After all, it's worked for 14,000 years. This is just the rich wanting to get richer without regard to the future of the planet or the people who live here.

8 1 Reply • Share ›

Jim Martindale
11 days ago

Violence marked the days of Noah when God repented of having made mankind. This violence or aggressive behavior has marked every genetically modified critter to date. What would make anyone think that these microbes will be any different? The USA is increasingly the most undesirable place to live and eat in the world unless of course, one desires to see the end of human habitation of the planet up close and personal.

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r2bzjudge
12 days ago

"Davos Leaders Sing Praises of GMO Soil Microbes"

What is their conflict of interest?

4 0 Reply • Share ›

MaryB435 → r2bzjudge
12 days ago

They want depopulation. Evil.
Don't trust those who want to kill.
Trust the Lord.

1 0 Reply • Share ›

Ricky Ricardo
12 days ago

I'm really, really tired of this conversation! We only have until May - at best!

4 0 Reply • Share ›

Gary Brown
11 days ago

March 28, 2023 The Great Food Reset has begun We all lose from the global war on farmers

France is in flames. Israel is erupting. America is facing a second January 6. In the Netherlands, however, the political establishment is reeling from an entirely different type of protest — one that, perhaps more than any other raging today, threatens to destabilise the global order. The victory of the Farmer-Citizen Movement (BBB) in the recent provincial elections represents an extraordinary result for an anti-establishment party that was formed just over three years ago. But then again, these are not ordinary times.

https://unherd.com/2023/03/...

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3 0 Reply • Share ›

Alison
12 days ago

Crispr has unleashed the endgame.
Tragic how the GMO-brained elite thinks they're immune to the fundamental damage they are causing. They will die along with us and lie in the same GMO-Earth.

3 0 Reply • Share ›

Seabreezes1
11 days ago

"**Re-educating consumers**" sounds like the **Re-education Camps** in China, Cambodia and Vietnam.

The ruling party never thinks they are wrong, they always think its about forcing compliance by whatever means at their disposal. Read George Orwell's "*Animal Farm*" and "*1984*."

1 0 Reply • Share ›

Michael atWAOI
11 days ago

Wake up.... there ARE problems in the existing agriculture for the masses.. BUT we do NOT want MONSANTO "gene-monified" PRETENDED SOLUTIONS....
Let's look at the solutions that COME FROM the AGRI-RURAL WORLD..
The WEF high-tech twisted brains BRAG about their GE-microbes that enhance NITROGEN–fixing for FERTILIZING their claimed earth "friendly" bio-agriculture.... they want to destroy farming people..

YEARS AGO, the Finns showed that HUMAN URINE was extremely safe [the produce harvested was "cleaner"] AND the plants were THIRTY PERCENT MORE PRODUCTIVE than with the usual commercial fertilizer.....
https://www.sciencenews.org...
Urine had precisely the N-P-K ratio to favor our human-diet's plants... NATURALLY!!!

The WEF distorted agriculture was rated as... “Everything we do leads to lower CO2 emission, lower chemical[s], lower waste, lower impact to the environment, healthier nutrients, higher sustainability on agriculture across the whole value chain,”

Wanna bet that HUMAN URINE beats their pricey, life-risking GE-microbes on EVERY MEASURE..
EXTREMELY lower CO2 than the commercial fertilizers...
LOWER CHEMICALS.... LOWER WASTE, ..LOWER ENVIRO IMPACT....
HEALTHIER NUTRIENTS [from the nitrogen fixed with urine]...

see more

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Beatrice → Michael atWAOI
11 days ago

Yes indeed. They are also using geoengineering to alter soil chemistry, climate and sunlight to destroy farmers.

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